UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/689,001	10/20/2003	Gayatri Vyas	8540G-236COA	4101

27572 7590 04/13/2007
HARNESS, DICKEY & PIERCE, P.L.C.
P.O. BOX 828
BLOOMFIELD HILLS, MI 48303

EXAMINER	
ALEJANDRO, RAYMOND	
ART UNIT	PAPER NUMBER
1745	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/13/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/689,001	VYAS ET AL.	
	Examiner	Art Unit	
	Raymond Alejandro	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 March 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25, 29-53 and 55-58* is/are pending in the application.

4a) Of the above claim(s) *23-25 and 29-53* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22 and 55-58* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☒ Certified copies of the priority documents have been received in Application No. 10/004,322.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 03/29/07 has been entered.

The examiner offers this communication in response to the amendment in connection with the filing of the aforementioned RCE. The 35 USC 102 rejections over Tateishi et al'690, the JP'870 and Hwang et al'228 have been overcome. However, all of the remaining rejections still stand. Refer to the foregoing amendment for substance of applicant's rebuttal arguments and remarks. Hence, all pending claims (including new claims 54-58) are again rejected over the remaining grounds of rejection as well as a newly discovered reference as advanced hereinbelow and for the reasons of record:

Election/Restrictions and Claim Disposition

1. Claims 26-28 and 54 have been cancelled.

2. Claims 23-25 and 29-53 have been withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention/species, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 07/20/06.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1-22 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The added material which is not supported by the original disclosure is as follows: (CLAIM 1) the new limitation "*non-ferrous*" and "*...in direct contact with said electrode...*". Applicant has not pointed out where the new or amended claim is supported, nor does there appear to be a written description of the claim foregoing limitations in the application as filed. That is to say, the newly claimed subject matter is not adequately described in the original disclosure.

a) with respect to the limitation "*non-ferrous*": nowhere does the as-filed specification recites, mentions or discloses the term "non-ferrous". At most, paragraphs 0013, 0022, 0037, 0038, 0041, 0043, 0073 and 0120-0121 broadly recite, mention or disclose "*a conductive coating comprising doped metal oxide, desirably a doped tin oxide and preferably a fluorine doped tin oxide*" (P0013, 0073), or the inclusion of dopants such as antimony, indium, or chlorine (P0022), or other elements such as Al, chromium, Ag, antimony, Mo (P0037, 0043), or specific coating oxides such as tin, zinc, or indium or an oxide an alloy thereof (P0041, 0120-0121). The

term "*non-ferrous*" is fully unsupported by the specification to the extent that it might be intended to imply ANY non-ferrous metal oxide.

b) as far as the limitation "...*in direct contact with said electrode*...", at best, paragraphs 0066 and Figure 1 of the as-filed disclosure support only gas permeable conductive materials 34, 36, 38 and 40 (gas diffusion member) in direct contact with the specific coating of the electrically conductive contact element as properly recited in claim 55. However, having the specific coating of the electrically conductive element in direct contact with "electrode" of the membrane electrode assembly is unsupported. In this instance, as apparently defined by the specification in paragraph 0066, shown in Figure 1 and claimed in claim 55, the electrode itself is different from the gas diffusion member. That is to say, neither an electrode itself corresponds to a gas diffusion member, nor does a gas diffusion member correspond to an electrode. Applicant is required to cancel the new matter in the reply to this Office Action.

5. Claims 1-22 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for certain metal oxides coatings such as oxides of tin, zinc, or indium or an oxide of an alloy thereof, does not reasonably provide enablement for ALL non-ferrous metal oxide compositions. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims. At most, paragraphs 0013, 0022, 0037, 0038, 0041, 0043, 0073 and 0120-0121 enable a skilled artisan to make and use coating compositions made only of certain oxides such as tin, zinc, or indium or an oxide of an alloy thereof, or to the extent that a dopant defines or be taken to be part of the oxide composition, doped metal oxides being doped with antimony, indium, or chlorine and/or Al, chromium, Ag, antimony, Mo. Bear in mind that the

recitation of "*non-ferrous*" includes ANY non-ferrous metal oxide which the as-filed description fails to describe in such a way to enable one of ordinary skill to use and make the claimed invention.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 1-22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

8. Claims 1 and 12 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: CLAIM 1 intends to recite that the metal oxide coating is "*in direct contact with the electrode*" (See CLAIM 1); CLAIM 12 intends to recite "*an electrically conductive porous material disposed between said electrode and said coated electrically conductive contact element...*" (See CLAIM 12). If the electrically conductive porous material is disposed between the electrode and the coated electrically conductive contact as recited in claim 12, then the limitation of having the metal oxide coating in direct contact with the electrode as recited in claim 1 is technically inaccurate because there is no such a direct-contact therebetween. If the opposite is true, then the recitation of claim 12 is technically inaccurate because nothing can be disposed between the coated contact element and the

electrode. If there is another structural connection or cooperating between all of the foregoing elements, then it has been definitely omitted in the present claims.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. Claims 1, 3, 13, 15, 18-21, 55 and 58 are rejected under 35 U.S.C. 102(b) as being anticipated by Li et al 5624769.

The present application is aimed at an electrochemical cell wherein the disclosed inventive concept is a the specific metal oxide coating applied to an electrically conductive contact element.

Concerning claims 1 and 55:

Li et al disclose a PEM (proton exchange membrane) fuel cell comprising a membrane electrode assembly (reference numeral 4, 6) comprising a solid polymer membrane electrolyte having an anode on one face of the membrane electrolyte and a cathode on the opposite side thereof; the membrane electrode assembly being sandwiched between a pair of electrically conductive elements (bipolar septum/plate 8, or end contact plates 14, 16) serving as current collectors for the anode/cathode and containing appropriate channels and openings therein for

distributing the gaseous reactants (i.e. hydrogen and oxidant-air) over the surfaces of the respective anode and cathode (COL 1, lines 15-27/COL 2, line 52 to COL 3, line 5/CLAIM 1/FIGURE 1). Gas permeable carbon current collectors 34, 36, 38 and 40 (gas diffusion element) are disclosed (COL 2, line 64 to COL 3, line 2). Additionally, the electrically conductive element (i.e. bipolar/septum 8) presses up against gas permeable carbon current collectors 36 and 38 (COL 3, lines 10-17/ FIGURE 1). *Therefore, the anode sides and cathodes sides of the membrane electrode assembly are in direct contact with the electrically conductive elements 8, 14 and 16 (bipolar septum/plate).*

EMPHASIS ADDED ↓:

Disclosure A: Li et al discloses the formation of an oxide films on the surfaces of the contact elements made from Al or Ti (COL 1, line 65 to COL 2, line 3).

Disclosure B: Li et al also disclose and illustrates bipolar septum/plate 8 or end contact elements 14 and 16 comprising a core 50 of a metal such as Al or Ti; a barrier/protective layer 52 of a metal which forms a passivating oxide film being deposited on the core 50, and is cover with a topcoat of Ti-nitride 54 (COL 3, lines 17-33). More importantly, disclosed therein is that the Ti-nitride topcoat is a micro-discontinuous coat having a plurality of defects therein exposing said protective coating to a corrosive operating environment (CLAIM 1 & CLAIM 3)

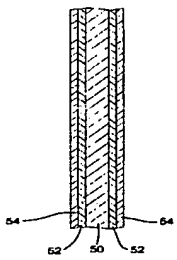


FIG. 2

As evident from **Disclosure A** above, conventional fuel cells have an oxide film on the surfaces of the contact elements made from Al or Ti. *Thus, the contact elements have thereon a film made of either Al-oxide or Ti-oxide.*

As further evident from **Disclosure B** above, the micro-discontinuous Ti-nitride topcoat has a plurality of defects therein exposing the barrier/protective metal layer 52 to the electrodes.

*Thus, one way or another, **Disclosure A** or **Disclosure B**, alone or in combination, fully support having a non-ferrous metal-oxide coating in direct contact with the gaseous reactants and the electrode part of the membrane electrode assembly.*

Concerning claims 3, 15 and 58:

Contact element is made of either Al or Ti (COL 1, line 65 to COL 2, line 3); OR bipolar septum/plate 8 or end contact elements 14 and 16 comprise a core 50 of a metal such as Al or Ti (COL 3, lines 17-33). *These metals are susceptible to corrosion.* Passivating oxide film 52 inhibits corrosion (CO 3, lines 23-32) or Al has the ability to passivate against corrosion (COL 3, lines 50-56).

As to claim 12:

Disclosed is the use of a carbon cloth placed between the electrode sides (anode side and cathode side) of the membrane electrode and the bipolar septum/plate or end contact elements (COL 2, line 64 to COL 3, line 3/ COL 3, lines 10-15/ FIGURE 1).

Concerning claims 13 and 18-21:

The pair of electrically conductive elements (bipolar septum/plate 8, or end contact plates 14, 16) contains appropriate channels and openings (reference numeral 18, 20, 22 , 24) therein for distributing the gaseous reactants (i.e. hydrogen and oxidant-air) over the surfaces of the

respective anode and cathode (COL 1, lines 15-27/COL 2, line 52 to COL 3, line 5/CLAIM 1/FIGURE 1).

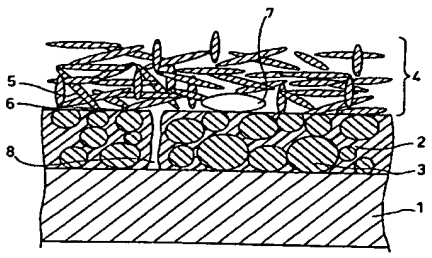
As a result, the present claims are anticipated.

11. ***(At least)*** Claims 1 and 55 are rejected under 35 U.S.C. 102(e) as being anticipated Gyoten et al 7005205.

Gyoten et al disclose a polymer electrolyte fuel cell having an electrolyte membrane electrode assembly having a polymer electrolyte membrane, and a pair of gas-diffusion electrodes sandwiching the polymer electrolyte membrane (ABSTRACT), and further comprising first and second electro-conductive separators having a metal substrate and an electroconductive resin layer thereon and contacting the electrolyte membrane assembly (ABSTRACT/COL 3, lines 19-26).

1st approach: it is imperative to note that the electroconductive resin layer incorporates therein an electroconductive particulate substance (COL 4, lines 5-15) and powders of metal oxide such as Ru-oxide are effective as the electroconductive particulate substance (COL 4, lines 15-21). As depicted in **Figure 1** below, electro-conductive particles 3 are dispersed in the electroconductive resin layer 2 and direct contact gas diffusion electrode 4 (See Figure 1/ COL 6, lines 12-30). *Thus, Ru-metal oxide particles directly contact the electrode 4.*

FIG. 1



2nd approach: Additionally, there is embodied in **Embodied Example 6** having a metal oxide layer between the metal substrate and the resin layer (EMBODIED EXAMPLE 6, COL 8, lines 35-52). *The electrically conductive property of the metal oxide film is inherent to the composition itself.* Gyoten et al teach that the oxide layer is situated between the metal substrate 1 and said electroconductive resin layer 2 (COL 8, lines 48-52/CLAIM 2). Notice also the presence of pin-hole 8 and gas diffusion electrode 4 (See FIGURE 1/COL 6, lines 12-30). *Given that pin-hole 8 directly provides an open path therebetween, it can be said that reactant gas diffusing through gas diffusion electrode also diffuses through the electroconductive resin layer 2. Therefore, said reactant gas contacts or communicates with the oxide layer placed between the metal substrate 1 and said electroconductive resin layer 2.*

Thus, the present claim is anticipated.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

13. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

14. Claims 2, 14, 22 and 56-57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al 5624769 as applied to claims 1, 13 and 55 above, and further in view of Gordon 4146657.

Li et al is applied, argued and incorporated herein for the reasons expressed above. However, the preceding prior art does not expressly disclose the specific fluorine doped tin oxide film.

Gordon disclose electrically conductive films of tin oxide comprising fluorine (ABSTRACT/COL 1, lines 5-25); fluorine doped stannic oxide (COL 2, lines 38-42). The coating is an electrically conductive coating (COL 1, lines 24-28/COL 2, lines 38-42) finding application in electrochemical systems or environments (COL 1, lines 12-18). The film material also exhibits good match of thermal expansion coefficient (COL 9, lines 33-42). The film includes 1-2.5 % of fluorine (COL 7, lines 10-12).

In view of the above, it would have been obvious to a person possessing a level of ordinary skill in the field of invention at the time the invention was made to use the specific fluorine doped tin oxide of Gordon in the electrochemical cell of Li et al because Gordon directly teaches that such specific oxide films find application in electrochemical systems or environments due to their high electrical conductivity and suitable thermal expansion coefficient.

15. Claims 4-12 and 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al 5624769 as applied to claim 1 above, and further in view of Applicant's Admitted Prior Art (heretofore 'the AAPA').

Li et al is applied, argued and incorporated herein for the reasons expressed above.

As to claims 9-10:

Li et al discloses the formation of an oxide films on the surfaces of the contact elements made from Al or Ti (COL 1, line 65 to COL 2, line 3). Li et al also disclose and illustrates bipolar septum/plate 8 or end contact elements 14 and 16 comprising a core 50 of a metal such as Al or Ti; a barrier/protective layer 52 of a metal which forms a passivating oxide film being deposited on the core 50(COL 3, lines 17-33).

As to claim 11:

As to the method limitation, i.e. the welded or braised metal sheet, it is noted that a method limitation incorporated into a product claim does not patentable distinguish the product because what is given patentably consideration is the product itself and not the manner in which the product was made. Therefore, the patentability of a product is independent of how it was made.

However, the preceding prior art does not expressly disclose the specific particle-binder matrix or graphite-filler-matrix substrates; and the specific conductive open cell foam layer.

As to claims 4-5 and 12:

The AAPA discloses that substrate forming the contact element comprises an electrically conductive composite material being a polymer having conductive powder embedded therein, wherein the conductive particles are typically graphite carbon or metal (*Applicant's specification*

at paragraphs 0076). Further disclosed is the inclusion of one or more layers disposed between the coating and the substrate, or the substrate itself having multiple layers (*Applicant's specification at paragraphs 0075).*

As to claims 6-8 and 16-17:

The AAPA mentions the use of a bipolar plate featuring a thin barrier sheet including foam and having a thickness which is being attached by welding or brazing; and forming fluid flow fields. Such a foam has opposed surfaces, is electrically conductive; it can be prepared as metal foams or carbon-based graphite foams (*Applicant's specification at paragraph 0077*).

In view of the above, it would have been obvious to a person possessing a level of ordinary skill in the field of invention at the time the invention was made to use the specific particle-binder matrix or graphite-filler-matrix substrates of the AAPA in the electrochemical cell of Li et al as the AAPA discloses such specific substrates enhance electrical contact between the composite element and the next adjacent fuel cell element. Thus, electrical conductivity and contact is improved.

With respect to the specific conductive open cell foam layer, it would have been obvious to a person possessing a level of ordinary skill in the field of invention at the time the invention was made to use the specific conductive open cell foam layer of the AAPA in the electrochemical cell of Li et al as the AAPA teaches that such a foam layer forms an electrically conductive element. Thus, electrical conductivity and contact is improved.

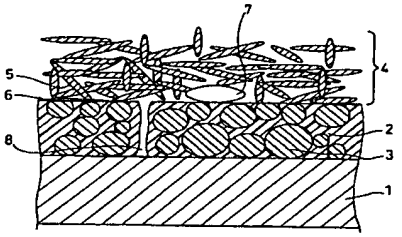
Response to Arguments

16. Applicant's arguments with respect to claims 1-22 and 55-58 have been considered but are moot in view of the new ground(s) of rejection. See item 10 supra.

17. Applicant's arguments filed 03/29/07 have been fully considered but they are not persuasive. Having overcome most of the 35 USC 102 rejections, the examiner only needs to respond to applicant's arguments concerning Gyoten et al'205.

1st approach: in this respect, (***emphasis supplied→***) it is imperative to note that electroconductive resin layer 2 incorporates therein an electroconductive particulate substance (COL 4, lines 5-15) and powders of metal oxide such as Ru-oxide are effective as the electroconductive particulate substance (COL 4, lines 15-21). As depicted in **Figure 1** below, electro-conductive particles 3 are dispersed in the electroconductive resin layer 2 and direct contact gas diffusion electrode 4 (See Figure 1/Col 6, lines 12-30). *Thus, Ru-metal oxide particles directly contact the electrode 4.*

FIG. 1



2nd approach: In addition to that, applicant has articulated that the reference "*fails to teach a metal oxide coating in communication with a reactant gas*". Interestingly, applicant has admitted that "*The oxide layer, being sandwiched between the substrate and the resin layer, prevents contact between the oxide layer and the reactant gas*" (See amendment dated 11/03/06 at page 16, last sentence of 2nd full paragraph). This applicant's statement or admission

contributes to the position taken by the examiner because the oxide is formed on the surface of the metal substrate 1 facing the gas diffusion electrode 4. Accordingly, reactant gas diffuses through pinhole 8 in the resin layer 2 and contacts the oxide layer deposited between the resin layer 2 and the metal substrate 1. Since the oxide layer prevents contact between the reactant gas and the metal substrate, it can be said that the oxide layer is acting as a direct barrier therebetween. Meanwhile, the oxide layer per is in direct contact with the reactant gas, and therefore in communication therewith.

Stated alternatively, Gyoten et al teach that the oxide layer is situated between the metal substrate 1 and said electroconductive resin layer 2 (COL 8, lines 48-52/CLAIM 2). Notice also the presence of pin-hole 8 and gas diffusion electrode 4 (See FIGURE 1/COL 6, lines 12-30). Given that pin-hole 8 directly provides an open path therebetween, it can be said that reactant gas diffusing through gas diffusion electrode also diffuses through the electroconductive resin layer 2. Therefore, said reactant gas contacts or communicates with the oxide layer placed between the metal substrate 1 and said electroconductive resin layer 2.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (571) 272-1282. The examiner can normally be reached on Monday-Thursday (8:00 am - 6:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Raymond Alejandro
Primary Examiner
Art Unit 1745

RAYMOND ALEJANDRO
PRIMARY EXAMINER